Business Unit

Retail Competition in Electricity - Opportunity and Challenges

Strictly Private and Confidential

October 2016

pwc

Introduction

Current status of competition in Indian power sector

The Preamble to Electricity Act 2003

An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, ***promoting competition therein*****.....**

Generation

2003 Competitive bidding under section 63 of EA 2003 to discover tariff

2005 MoP issued 'Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Discoms' (Case 1 and Case 2)

2013 DBFOO and DBFOT guidelines

Transmission

'Tariff based Competitive-bidding Guidelines for Transmission Service, 2006' by Ministry of Power

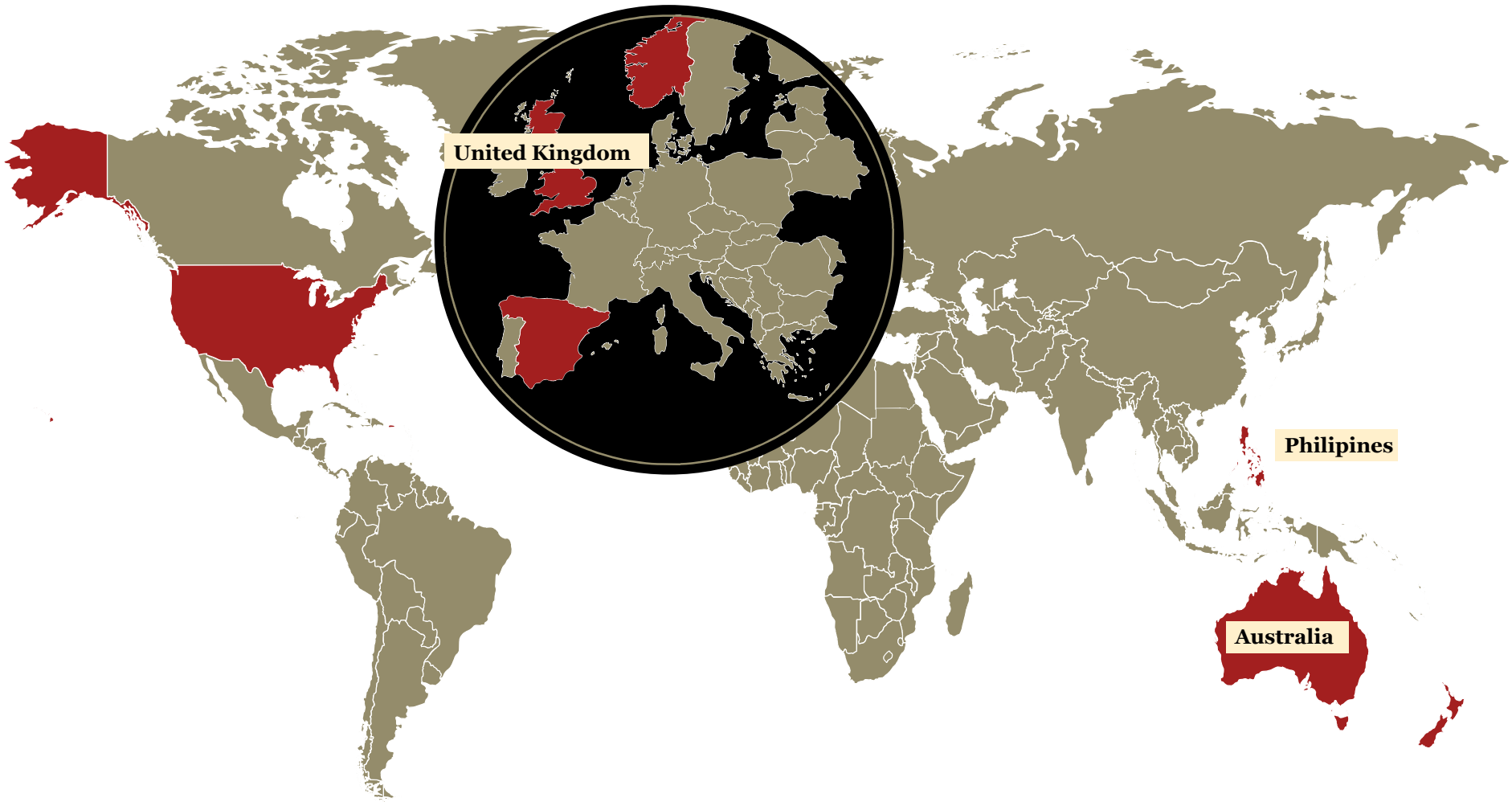
Standard bidding documents were issued by the Ministry of Power in 2008 which were later amended in 2008, 2010, 2011 and in 2013 subsequently

Distribution

EA 2003 laid down the foundation for introducing competition at the consumer end through -

- **Open Access –** failed to pick up due to *high cross subsidies*, lack of infrastructure and lack of incentives for generators
- **Parallel Distribution Licensee –** failed to pick up as it requires Discoms to distribute power *"through their own distribution system within the same area"*

International Experience



United Kingdom

	Pre-Reforms After WWII till 1989	**Reforms** Electricity Act 1989	**Retail Competition** April 1990 - May 1999
Generation	Central Electricity Generating Board (CEGB) owned and operated the transmission system and the generating stations	Unbundling of CEGB – • National Power → **Privatised** • Powergen → **Privatised** • Nuclear Electric	**Phasing –** • Phase 1, 1990: 1MW and above • Phase 2, 1994: 100kw and above • Phase 3, 1998: All loads
Transmission		• National Grid Company → **Privatised**	**Functional Separation –** • Till 1997: REC ran both distribution and supply business • 1997: All RECs asked to separate distribution and supply functions (they could own both) • 2000: abolished the existing distribution/retail licences, and introduced a Great Britain-wide licence, allowing all suppliers to supply customers nationwide
Distribution	14 area boards responsible for distribution and retail sale of electricity	14 area boards replaced with Regional Electricity Companies (RECs) → **Privatised**	**Metering –** Metering activity is subdivided in two 3rd party activities – (appointed by Retailer) • MAP (Meter Asset Provider) • MOP (Meter Operator) Metering Agent Competition introduced in April 2000
Regulatory/ Others		Established the electricity pool as the wholesale market mechanism through which electricity was traded	

Philippines

	Pre-Reforms Before 2001	Reforms EPIRA Act 2001	Retail Competition Retail Competition and Open Access, Dec 2012
Generation	National Power Corporation (NPC) owned and operated the transmission system and the generating stations	Generation de-regularised Unbundling of CEGB – • Generation Assets → **Privatised**	Contestable consumers to enter into Retail Supply Contracts with retail suppliers or source power through Open Access from WESM or remain with its incumbent Distribution Utility **Phasing –** • Phase 1, 2013: 1MW and above • Phase 2, 2016: 750kw and above • Phase 3, 2018: 500kw and above **Segregation –** • Existing Distribution Utilities, handle the wire business in their respective franchise area and act as Provider of Last Resort (POLR) • Electricity Supply made a separate licensed activity. Retail Electricity Suppliers (RES) can supply to any contestable consumer **Metering –** Metering responsibility given to Distribution Company **Steps to promote competition -** No RES allowed to supply >30% of total peak demand in retail market and transact >50% of its supply business with its affiliate contestable customers
Transmission		• Govt. owned Transmission Company → **Privatised**	
Distribution	Private investor-owned electric utilities, local government-owned utilities and electric cooperatives located within distinct franchise areas	• Separate Distribution and Supply Licensee introduced • Removal of Cross Subsidies by 2005 and introduction of Universal Surcharge for phasing out period	
Regulatory/ Others		• Creation of an independent regulator (Energy Regulatory Commission) • Creation of Wholesale Electricity Spot Market (WESM) for trading of energy	

Australia (Victoria)

	Pre-Reforms Before 1993	**Reforms** August 1993	**Retail Competition** Dec 1994 to Jan 2002
Generation	State Electricity Commission of Victoria (SECV) owned and operated the generation, transmission and distribution system in Victoria	Unbundling of SECV – • Several competing generation businesses	Till a consumer becomes contestable, the distributor who controlled the particular franchise area would perform functions of retailer. Once consumers became contestable, they are free to choose any licensed retailer **Phasing –** • Phase 1, 1994: 40 GWh and above • Phase 2, 1995: 4GWh and above • Phase 3, 1996: 750MWh and above • Phase 4, 1998: 160MWh and above • Phase 5, 2000: all consumers **Segregation –** • Existing Distribution Utilities, handle the wire business in their respective franchise area and supply to non-contestable consumers • Electricity Supply made a separate licensed activity. Retail Electricity Suppliers can supply to any contestable consumer **Metering –** Metering responsibility given to Retail Supplier. Supplier can either appoint Distribution Company or 3rd party metering provider.
Transmission		• Monopolistic Transmission Co.	
Distribution	Some small franchisees operating in urban areas for supply of electricity	• Distribution Companies with geographical monopoly franchises • 2-tier system for retail businesses • 1st-tier retailers - attached to a distribution business • 2nd-tier retailers were the stand-alone businesses	
Regulatory/ Others			

Progression of retail competition concept in India

Sequence of events

FOR Study Report – Introducing competition in retail supply of electricity
PwC assisted FOR in preparation of Blueprint for introducing retail competition in India

FOR Study Report – Roll out plan for introduction of competition
PwC assisted FOR in preparation of various options of roll out plan for introducing competition in retail sale of electricity in states

Electricity (Amendment) Act
MoP introduced the bill in parliament which envisaged separation of wires and retail businesses

FOR report - Introduction of competition in retail supply, 2013

Scope of the report -

- Review international experiences
- Recommend a competitive retail supply model
- Identify crucial bottlenecks in the implementation of retail competition

Pre-requisites suggested for reforms -

1. **Development of a Wholesale Market** – so as to reduce dominant position of generators and improve power procurement efficiencies
2. **Cost Reflective Tariffs –** so as to reduce cross subsidies
3. **Treatment of existing distribution and financial losses –** allocation between distribution and retail supply businesses
4. **Suitable supply infrastructure –** advanced metering in competitive segment of the market

Suggestions for introducing retail competition -

1. **Segregation of ownership of the distribution (wire) and retail supply functions –** so as to bring neutrality in distribution network
2. **Phased approach with clear milestones –** a timeline was suggested for various phases of implementation
3. **Provision for Provider of last resort –** Duty to Connect and Duty to Supply a consumer
4. **Standards of Performance –** division of SOPs between Distribution and Supply functions

Electricity (Amendment) Bill 2014

Key provisions of Electricity Amendment Bill 2014

Separation of Carriage & Content

- Separation between distribution and supply function to promote competition in the supply segment

Renewable Energy Promotion

- Mandating thermal power developers to establish RE capacity (5% of new generation capacity post commencement of the Electricity Act Amendment) or procuring renewable energy of such capacity
- License will not be required to generate and supply electricity from renewable sources.
- Cross subsidy will not be levied for open access based on renewable energy sources
- Central government to formulate National Renewable Energy Policy

Enhancing Grid Safety and Security

- Enhanced penalties for violations of the directions given by SLDC and RLDC
- Maintenance of spinning reserves by the Generation company.
- Promote efficiency in the operations of the National Grid.

Miscellaneous

- Proposes to reduce the term of office for the chairperson or other members of the Central or State Regulatory Commission from five years to three years.
- Allows for re-appointment of the chairperson and members for one more term in the same capacity in which they had earlier held office

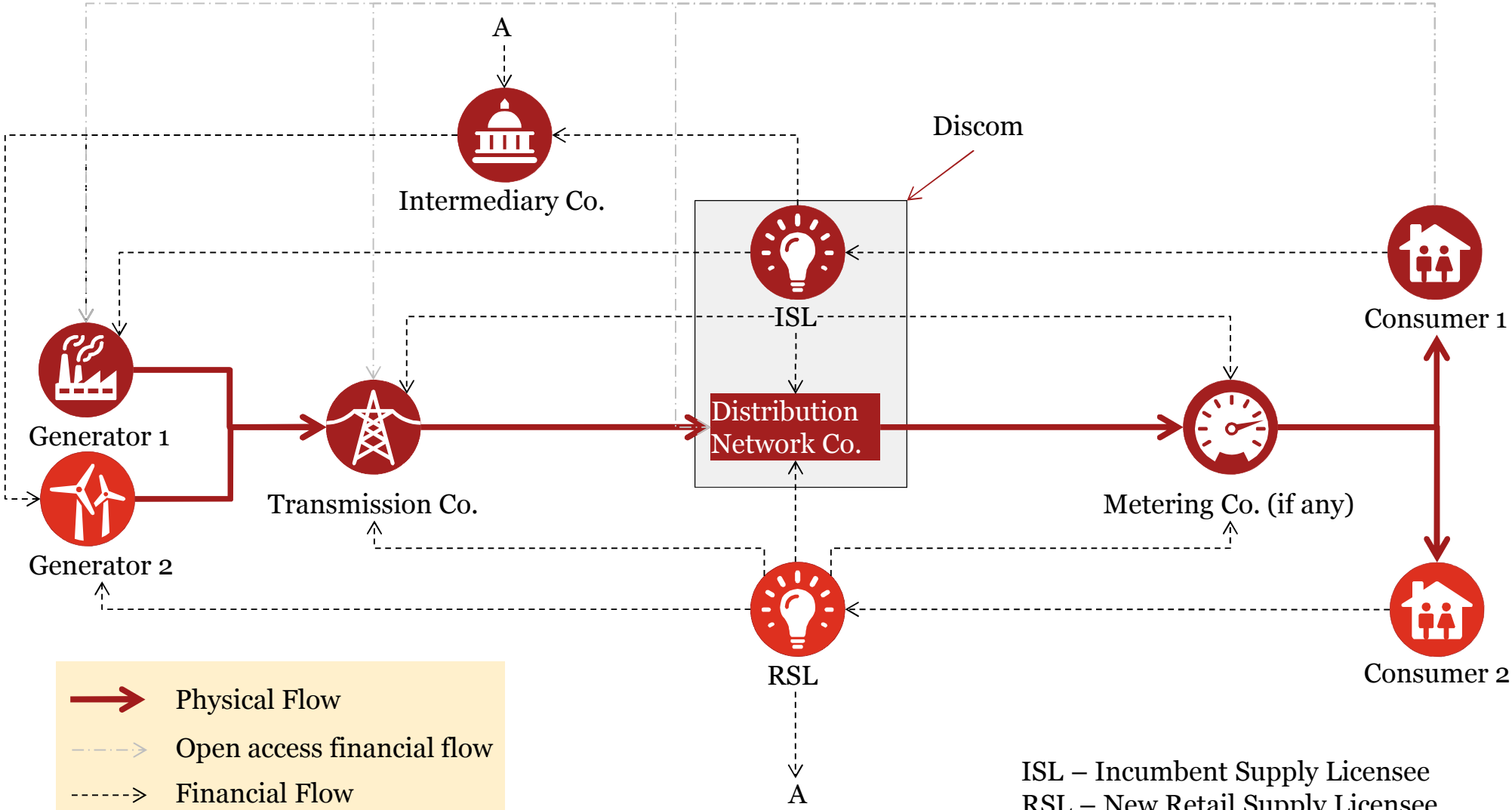
Key provisions of Electricity Amendment Bill 2014

Separation of Carriage & Content

- Separation between distribution and supply function to promote competition in the supply segment

Proposed Changes	Relevant Sections
• Current Discoms are to be split into Distribution (carriage) and Incumbent Supply (content) businesses	*Section 2* *"Supply licensee" means a person authorised under section 14 to supply electricity to consumers…*
• Duties and Functions of Distribution and Supply businesses defined separately	*Section 42 – Duties of Distribution licensee* *Section 51A – Duties of Supply licensee*
• Multiple Supply licensee allowed in a license area	*Section 14* *…. Commission may grant a licensee to two or more persons for supply of electricity within the same area of supply…*
• Single Distribution company envisaged in a license area	*Section 12* *… Commission shall not grant licence to more than one distribution licensee in any area of distribution…*
• Intermediary Company to be formed for taking over existing PPAs	*Section 2 (35B)* *Intermediary Company means the entity succeeding to the existing PPA and procurement arrangements of the relevant distribution licensees…..*
• Transfer scheme to be made by state governments for segregation of content and carriage businesses	*Section 131 (4A)* *…scheme for transfer of such of the functions, the property, interest in property, rights and liabilities of the distribution licensees relating to supply of electricity to a company who shall be the incumbent supply licensee for the concerned area of supply…*

Industry structure under Retail Supply Competition



FOR report – Roll out plan for introduction of competition in retail sale of electricity, 2015

Stage wise tasks required for retail competition roll out

Stage wise approach was suggested for introduction of competition in retail sale of electricity. In each stage a list of tasks was prepared which should be carried out for smooth reforms

	Stage	Timelines
1	**Functional Separation of Discoms:** In this stage, the current Discoms would be segregated into Distribution and Retail Supply Companies. Their roles and responsibilities will be defined and they would be equipped with enough financial and manpower resources to take on those roles.	1-2 year(s)
2	**Preparation for Competition:** In this stage, the steps would be taken to make the market conducive for retail supply competition like ownership segregation, cross subsidy reduction, upgradation of metering, loss allocation etc. Entry barriers would be removed in order to create a level playing field for all and encourage competition.	Start: after stage 1 objectives are achieved Completion time: 2-3 years after completion of Stage 1
3	**Onset of Competition:** New Retail Supply Licenses would be given in this stage in order to give retail consumer choice. The market would be opened up for competition in phases i.e. initially certain set of consumers would be open to competition and then gradually other consumers will be brought under the purview of competition.	Start: after stage 2 objectives are achieved This stage will be an ongoing activity till the time all categories are open for competition

Stage wise tasks for introducing retail competition

Major tasks

Stage 1 – Functional Separation of Discoms

1. Defining new functional entities
2. Defining Roles & Responsibilities
3. Transfer of existing financial losses
4. Transfer of existing PPAs
5. Consumer Interface
6. CGRF Mechanism
7. Standards of Performance
8. Universal Service Obligation
9. Tariff Determination Mechanism
10. Balance sheet segregation
11. Human resource planning
12. Technical studies of as-is condition

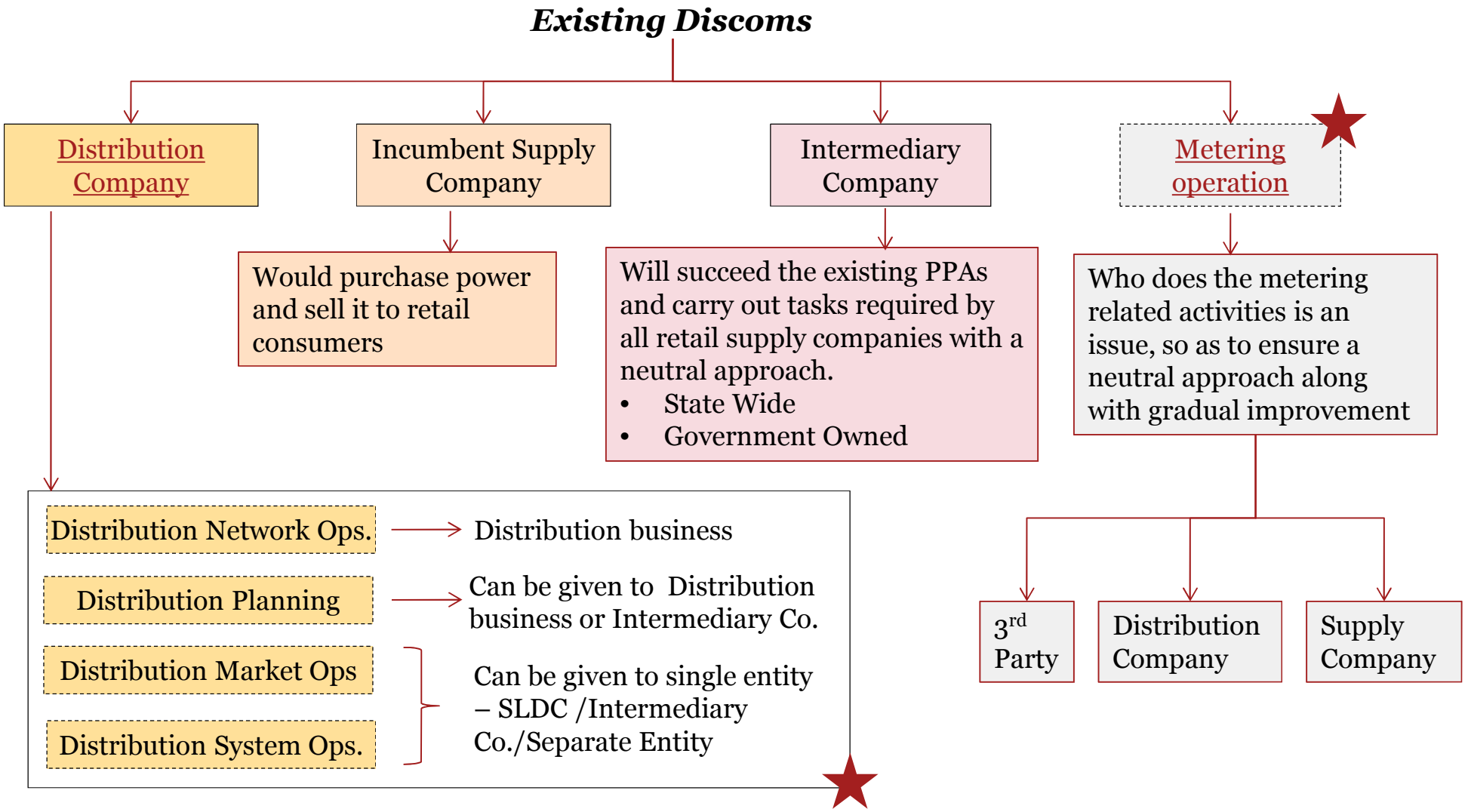
Stage 2 – Preparation for Competition

1. Ownership of network & Retail Supply Company
2. Technical and Commercial loss allocation
3. Reduction of Cross Subsidies
4. Up gradation of metering
5. Consumer Database

Stage 3 – Onset of Competition

1. Defining license area & issuance of new supply licenses
2. Phasing of competition
3. Allocation of existing PPAs
4. Consumer switching mechanism
5. Procurement of new PPAs
6. Balancing and settlement
7. Tariff Determination
8. Defining POLR
9. USO extends to new retail suppliers

Defining new functional entities



Allocation of financial losses - Regulatory Assets (RA) and un-recognised financial losses

Financial losses

Recognised losses

The Regulatory Assets will be transferred to Intermediary Company

Amortisation through -

- UC Charge
- State Govt. funding
- Hybrid

Un-recognised losses

Unrecognised financial losses are due to factors like costs disallowed by the regulators

Amortisation through -

- Incumbent companies take financial hit
- Part or Full recovery through state government funds

Consumer Interface

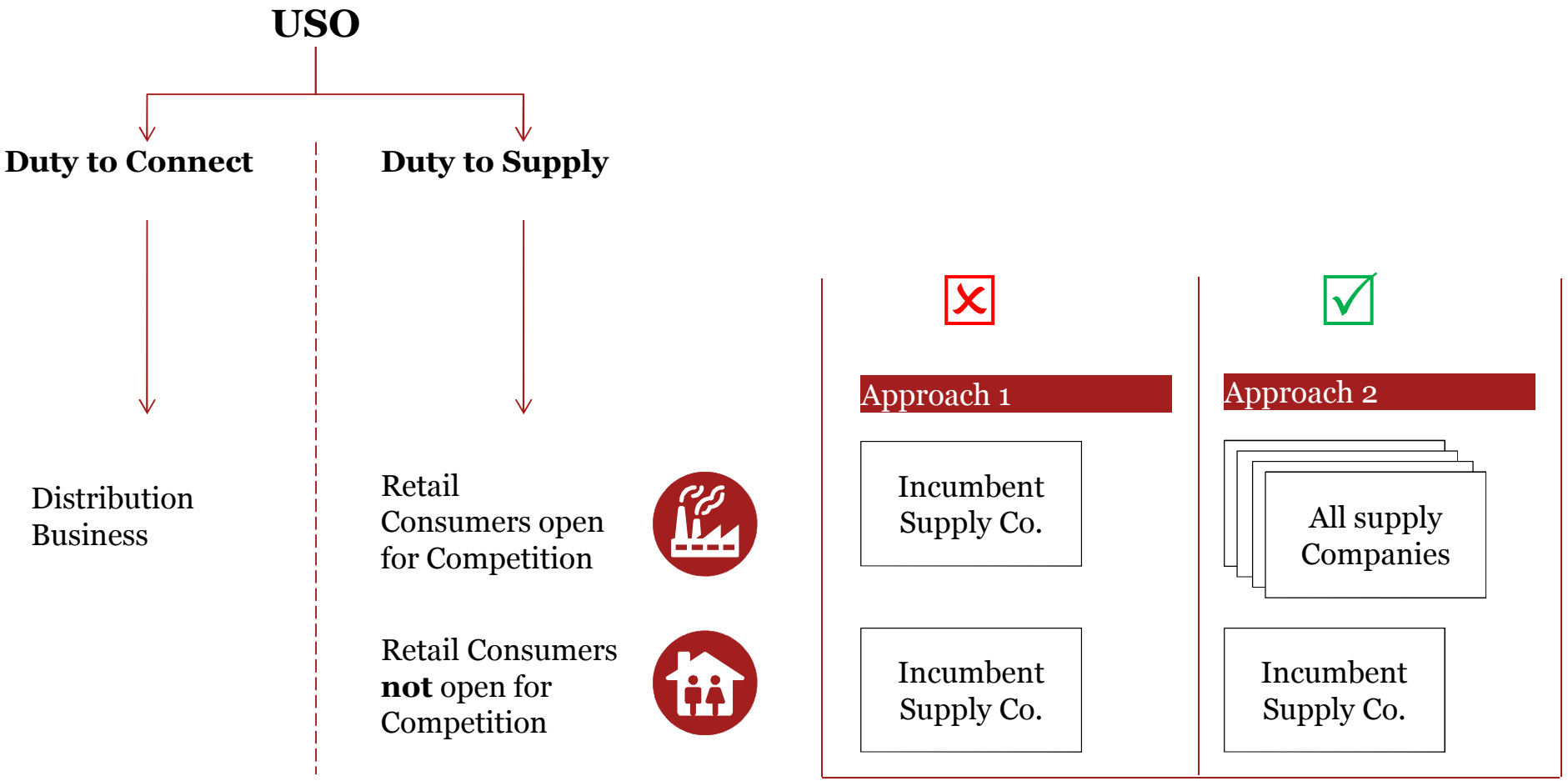
Issue/Approach	Approach 1 ☑	Approach 2 ☒	Approach 3 ☒
Features of approaches - Type of Consumers			
Interface for retail consumer	Supply Company	Distribution Company	Supply Company
Interface for open access consumer	Supply Company	Distribution Company	Distribution Company
Features of approaches - Type of complaints/queries/requests			
Resolution of supply related issues	Supplier would take care at its end	Distribution Company would redirect to supplier	Supplier would take care at its end
Resolution of network issues	Supplier would redirect to Distribution Company	Distribution Company would take care at its end	Distribution Company would take care at its end
Parameters for evaluation of approaches			
Ease of consumers	Single Interface	Single Interface	Multiple Interface
Setting the accountability	Could misguide consumer and shift blame. May want to resolve issues quickly to prevent consumer migration	Could misguide consumer and shift blame	Supplier and Distribution both accountable for respective issues
Duplication of work	Complaints/queries/requests would have to be routed from supply to distribution companies	Complaints/queries/requests would have to be routed from distribution to supply companies	Duplication of efforts could be prevented
Need for new customer care assets	The existing customer care centres would be shifted to retail supplier	The existing customer care centres would be shifted to Distribution	New assets would have to be developed

Standards of Performance (SOPs)

The list of current SOPs will be allocated between the new entities based on the division of roles and responsibilities, as follows -

SOP	Distribution	Supply	Intermediary	Metering (if any)
Operation of Call Centre		✔		
Restoration of Supply	✔			
Quality of Supply	✔	✔		
Meter Complaints				✔
Shifting of meter	✔			✔
Shifting of service lines	✔			
New Connection	✔	✔		
Additional Load	✔	✔		
Transfer of Ownership		✔		
Change of Category		✔		
Temporary supply of Power		✔		
Consumer bill complaint		✔		
Disconnection of Supply	✔	✔		
Reconnection of Supply	✔	✔		

Universal Service Obligation



Allocation of technical and commercial losses

Type of Loss	Allocation to -		
	☑ Approach 1	☒ Approach 2	☑ Approach 3
Technical	Distribution	Distribution	Distribution
Commercial			
Theft by Hooking	Distribution	Distribution	Retail Supply
Inaccurate metering	Distribution	Retail Supply	Retail Supply
Theft by Meter tampering/bypassing	Distribution	Retail Supply	Retail Supply
Collection inefficiency	Retail Supply	Retail Supply	Retail Supply

Easy to implement. But may lead to conflict of interest

Metering would be required at several levels

SOPs would need to ensure that hooking cases reported by Supplier are resolved by Distribution Co.

Factors for selection of approach

Current Level of AT&C loss

Low -> Approach 1
so that the balance sheet of Distribution Company may sustain such loss levels

High – Approach 3
as the balance sheet of Distribution Company may not be able to sustain such loss levels

In case metering is a licensed activity, the commercial losses (other than collection inefficiency) can be allocated to the metering co.

Back to stage wise table

Reduction of Cross Subsidies

1. Year on Year tariff hikes –

Based on detailed Cost of Supply calculation for each consumer category, the tariffs are realigned every year.

Pros- makes the tariff cost reflective

Cons - Does not take into account ability to pay. Can lead to steep tariff hikes.

2. Direct subsidy –

State Government directly funds the gap between Cost of Supply and Tariff instead of asking consumer categories to cross subsidies themselves.

Pros - Can be implemented immediately. Transparent mechanism.

Cons - Additional financial burden on state. The financial burden would increase year on year as consumer sales increase or cost of supply increases

1. Universal Charge (UC) –

- A Uniform non by-passable charge is applied on all consumers
- Fund created from this charge used to fill the revenue-cost gap of discom
- UC is charged over and above relevant tariff

Pros- transparent mechanism. Consumer will come to know the subsidy being paid/received

Cons - Complex mechanism to calculate and collect UC. Will indirectly lead to tariff hikes.

Microsoft Excel Worksheet

2. Limit subsidies to wheeling charge –

Cross subsidies could be located in the wires component of the distribution tariff. Since wires are a monopolistic regulated industry, cross subsidies would not explicitly affect competition. It will create a level playing field for all retail suppliers

Pros- Level playing field for all retail suppliers in a future market with retail supply competition

Cons - The wheeling charges may not be enough to consummate the current high levels of cross subsidies

Back to stage wise table

Phasing of Competition: Area of Supply

Issue/Approach	Approach 1 – same area of supply ☑	Approach 2 – breaking up area of supply ☑
Size of current area	(if USO on all suppliers) new retail supplier could find big area of supply as an entry barrier (if USO on incumbent supplier) new supply company could chose whom to supply	Bigger areas could be broken down to attract new players with less capital also
Loss variation	Average losses could be given to all suppliers	Suppliers could cherry pick areas with lower loss levels, to supply electricity
Consumer profile	Variation of consumer profiles would average out in a bigger area of supply	Suppliers could cherry pick areas with better consumer profiles, to supply electricity

Uniform consumer mix across supply areas –each supply area formed should have a similar consumer mix and energy sales mix. This would ensure that all supply areas have similar levels of cross subsidies, losses, energy load curves and baseline requirements.

Package of areas –a package of cities or areas could be offered to the new retail supply companies, wherein each such package is comparable to one another. For example: an urban area and a rural area could be offered as a package to ew retail supply companies

Back to stage wise table

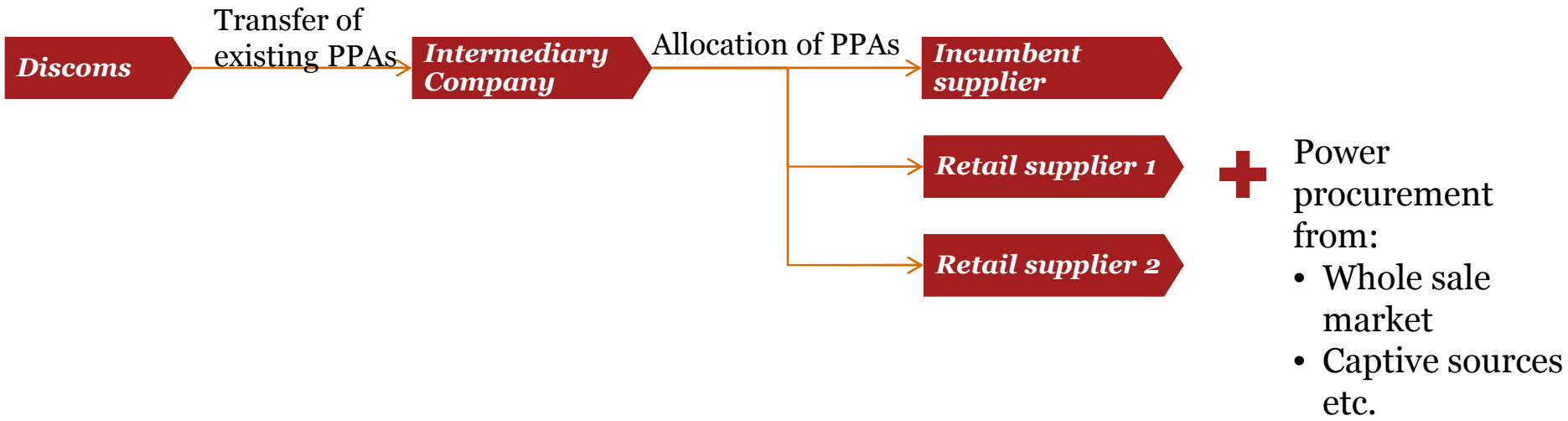
Phasing of Competition: Consumer Phasing

	Approach	Pros	Cons
☑	**Increasing connected load**	• **Greater efficiency:** since consumer with smaller load may have max contribution to losses • **Prevention of Cherry Picking:** since subsidised consumers would be contestable, suppliers would not get opportunity to cherry pick	• **Difficulty in implementation** • **Nonstarter for reforms:** new supply companies could find this proposition not attractive enough • **Switching costs**
☑	**Decreasing connected load**	• **Early adaptors:** Consumers with large loads are more likely to take advantage of retail supply competition • **Starter for Reforms:** Lower losses among large consumers would be incentive for suppliers	**Cherry Picking:** In case situations of cross subsidies and loss levels are not improved, good consumers of existing supply companies could migrate
☒	**Increasing annual consumption**	**Greater efficiency:** consumer with lower sales may have max contribution to losses, providing opportunity to bring efficiency quickly through faster AT&C loss reduction	• **Changing consumption patterns**: inc/dec of energy consumption could pose difficulties • **Difficulty in implementation** • **Nonstarter for reforms**: new supply companies could find this proposition not attractive enough
☒	**Decreasing annual consumption**	**Early adaptors:** Consumers with large loads are more likely to take advantage of retail supply competition	**Changing consumption patterns**: inc/dec of energy consumption could pose difficulties
☒	**Area of sales**	• Areas with lower losses could be opened to competition first to attract new supply co. or vice versa • Pilot scheme could be introduced in some areas	Determination of area wise losses and allocation between retail supply companies would be an issue
☒	**Consumer categories**	• Categories with lower losses could be opened to competition first to attract new suppliers or vice versa	Determination and allocation of consumer category wise losses would be an issue

Back to stage wise table

Transfer & allocation of existing PPAs

- Existing Discoms have long term PPAs which will shift to an Intermediary company to be formed
- Subsequent to retail competition, eligible consumers would switch their supplier
- The intermediary company would hold all PPAs and dynamically allocate power between ISL and RSLs based on switching of existing customers
- The RSL could only procure from the market for additional power if the Intermediary company is not able to provide them.
- In states which have committed orsigned long term contracts with generators will have limited flexibility to bring in efficiency from power procurement



Allocation of PPAs – other issues

1. **Who bears the financial loss in case Intermediary Company is unable to fulfil its PPA obligations –** such losses can be taken care by
    1. State Government support
    2. Socialisation through Universal Charge

2. **Parameters basis which allocation will be done -** considering factors like Duration of PPAs, average/peak demand of consumers with each Supply company, consumer mix of Supply companies, size of PPAs etc.

3. **PPA allocation or Power allocation**

4. **Price for allocation**
    - Actual cost of PPA
    - Uniform/Average cost
    - Differential Bulk Supply Tariff (based on consumer mix)

5. **Fixed or Dynamic allocation of PPAs/Power**

Balancing and Settlement

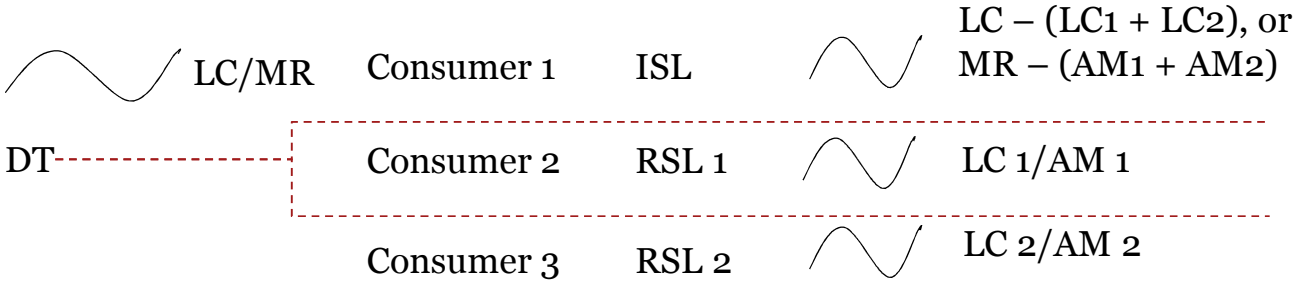
Approach 1 –

Making Advanced metering compulsory for new Retail Supply Companies

or

Approach 2 –

Based on consumer category wise sample load curve



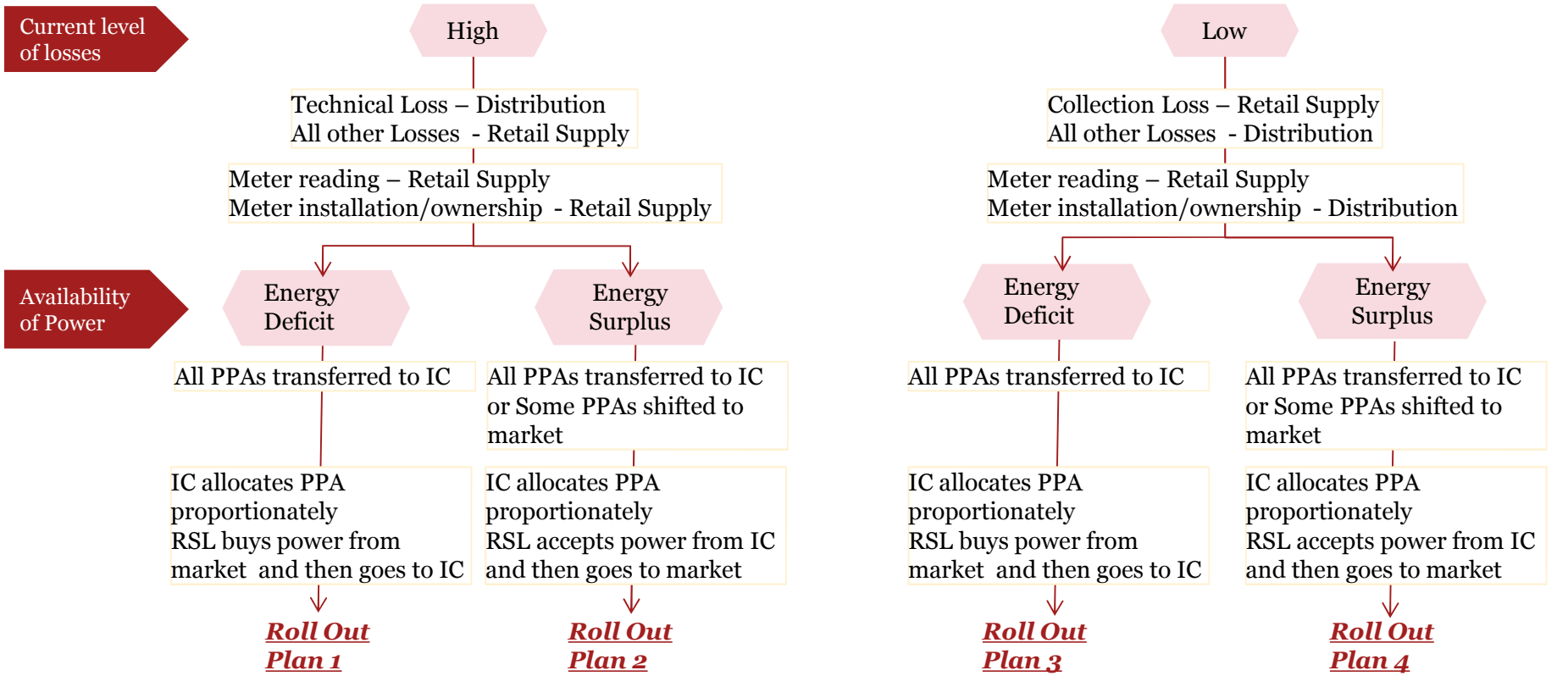
Approach	Pros	Cons
Making Advanced metering compulsory for new retail supply companies	• Would ensure gradual replacement of existing metering by Advanced metering • Actual values of power consumption for each supplier can be calculated	• High cost of Advanced metering could become entry barrier for new retail supply companies
Based on consumer category wise sample load curve	• No need of expensive Advanced metering in initial stages	• Would not give actual values of power consumption of retail supply companies

LC – Load Curve
AM – Advanced Metering

Tariff Determination

SERCs will determine unbundled tariffs individually for Distribution Company, Retail Supply Company and Intermediary Company, as follows -

Tariff for Distribution Co.	Tariff for Retail Supply Co.	Intermediary Co.
The SERCs would determine a regulated tariff allowing for – • Network Capex • Opex • Losses	**For consumers not open to competition -** The SERCs would determine a regulated tariff, allowing for– • Power Purchase cost • Opex • Losses • Capital assets **For consumers open to competition –** For new Supply Companies, a ceiling tariff would be set	The SERCs would determine following allowed costs - • Costs towards PPAs • Opex



Factors common for all scenarios

- Cross Subsidy reduced via UC fund or direct subsidy
- USO on all Suppliers
- Consumer database maintained by Distribution
- Mandatory advanced metering for RSLs to facilitate Balancing and Settlement
- POLR on ISL for first year, later as decided by SERC
- Consumer Interface with retail suppliers
- 1 year lock in period after consumer switch
- Separate SOPs for distribution & supply
- Tariff determination:
  Distribution – Regulated tariff
  Supply – Ceiling for contestable consumer, Regulated for non contestable consumer
- Phasing based on decreasing or increasing connected load*

**Caveat of phasing based on increasing connected load* → Majority of consumers with connected load of less than 20 kW are connected at lower voltage where majority of losses occur. Opening competition to this large consumer base at a go, coupled with USO, might be difficult to implement and become a non starter for reforms. As such a feasible option is to phase out based on decreasing load but with mandatory requirement of urban/rural consumer mix. Increasing connected load approach may be adopted in smaller states/UTs like Chandigarh, Goa and Puducherry etc.

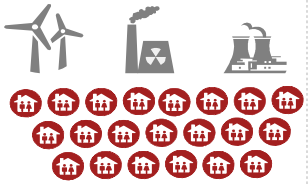
Roles and Responsibilities of Regulators

Requirements from Regulators to enable retail competition

Standards of Performance	Establish separate SOPs for different licensed activities of Distribution and Supply
Cross Subsidies	Work limiting cross subsidies so as to dissuade cherry picking and create level playing field
AT&C Losses	Detailed studies for identifying component wise losses and allocating them between Distribution and Supply functions
Tariffs	Work towards cost reflective tariffs determination methodologies

Opportunities due to retail competition

New transformational market models will emerge as markets shift away from incremental change – Indian Scenario

Market models	Interconnected-grid	Green command and control	Niche retail suppliers	Local energy systems	Ultra distributed generation
					
Characteristics	low high	low high	low high	low high	low high
Ave generator size					
Consumer role					
Government intervention					
Service delivery digitalisation					
New entrant opportunities					
Local factors	• Mature national infrastructures • Limited indigenous fuel sources • Clear cost benefits of market integration • Political stability	• Limited private sector involvement • Government direction on capital investment • Reliability and price stability are valued over cost	• Different types of consumers have different needs • Retail Suppliers could develop strategies to target a specific type of consumers	• Sufficient private funding • Rural electrification policy • Interest from private capital • Local communities taking control	• Mature infrastructure • Strong customer engagement in micro-generation • Interest from private capital • Average/peak demand differential

Emerging roles

	Description	*Scope in India*
Gentailer	Own generation assets and sell retail energy to customers in a competitive market	• High • Private generators with stranded capacity could enter retail supply space
Pure play merchant	Owns generation assets and sells power into competitive wholesale markets or through bilateral contracts	• Medium • The development of wholesale electricity markets is still in nascent stages
Grid developer	Acquires/develops, owns and maintains transmission assets connecting generators to distribution systems	• Low • Transmission is regulated and monopolistic business
Network manager	Operates transmission and distribution assets and provides network access to generators and retail service providers	• Medium • In long term, the distribution system operator and distribution network operator can be separate entities

Emerging roles

	Description	*Scope in India*
Product innovator	Offers electricity and behind-the-meter products such as solar, fuel cells, EV chargers, and smart devices	• High • With increasing competition, businesses would have to develop niche market differentiators
"Partner of Partners"	Offers standard power and gas plus a range of energy services using high quality, branded partnerships	• Medium • Regulatory reforms would be required simultaneously in multiple sectors
Value-added enabler	Uses core "big data" capabilities to provide enhanced energy services to customers not wanting to actively manage their energy use	• High • With decreasing price of new technologies and pricing pressures the demand for value add services would increase
"Virtual" utility	Aggregates generation from distributed systems and acts as intermediary between/with energy markets without owning generation/T&D assets	• Low • This would require well functioning energy markets which are still in nascent stages

Thank you

Appendix 2
Supporting slides for tasks of introducing retail competition

Functional separation of current Discoms

Metering services

Activity	Approach 1	Approach 2	Approach 3
Meter Reading	Retail Supply Company	Retail Supply Company	Distribution Company
Other Meter related	3rd Party	Retail Supply Company	Distribution Company

Activity	Approach 4	Approach 5
Meter Reading	3rd Party	Retail Supply Company
Other Meter related	3rd Party	Distribution Company

Factors for consideration

Each of the above mentioned approach is considered along with approach adopted towards loss allocation (3 possible approaches, as discussed in earlier slides)

Metering services ***Approach I***

New Scenario: Losses allocated to 3rd party company assuming metering is a licensed activity

- Meter reading – Retail Supply Company
- Other activities – 3rd Party Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)	Approach 4
Technical Loss	Distribution	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply	3rd party company
Inaccurate Metering	Distribution	Retail Supply	Retail Supply	3rd party company
Meter tampering	Distribution	Retail Supply	Retail Supply	3rd party company
Collection Loss	Retail Supply	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them	Unlikely as supplier would have to generate lesser billing
Hooking losses	Supplier would have no incentive t o report	Supplier would have no incentive t o report	Supplier would have incentive to report	3rd party would have incentive to report
Meter tampering / bypassing losses	Supplier would have no incentive t o report	Supplier would have incentive to reduce the losses	Supplier would have incentive to reduce the losses	3rd party would have incentive to reduce the losses
Conflict of Interest	Duty to install meter applicable on 3rd Party, but Supplier responsible (as per Section 55 of EA2003)			
Capital investment	3rd party can do focused investments			
Ease of billing	Both meter reading and bill generation with same entity			
Number of visits to consumer	Separate visits for meter reading and meter operations			
Ease of consumer switching	No change required in metering			

Metering services ***Approach II***

- Meter reading – Retail Supply Company
- Other activities – Retail Supply Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as the supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them
Hooking losses	Supplier would have no incentive t o report	Supplier would have no incentive t o report	Supplier would have incentive to report
Meter tampering / bypassing losses	Supplier would have no incentive t o report	Supplier would have incentive to reduce the losses	Supplier would have incentive to reduce the losses
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter with supplier itself		
Capital investment	May lead to duplication		
Ease of billing	Both meter reading and bill generation with same entity		
Number of visits to consumer	Single visit for meter reading and meter operations		
Ease of consumer switching	Change required in metering		

Metering services ***Approach III***

- Meter reading – Distribution Company
- Other activities – Distribution Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Distribution Co. could inflate billing to hide meter tampering/ bypass or hooking losses	Distribution Co. could inflate billing to hide hooking losses	Since commercial losses are allocated to Supplier, Distribution would not have incentive to fudge
Hooking losses	Distribution Co. would have incentive to reduce the losses	Distribution Co. would have incentive to reduce losses	Distribution Co. would have no incentive to reduce losses
Meter tampering / bypassing losses	Distribution Co. would have incentive to reduce the losses	Distribution Co. would have no incentive to reduce losses	Distribution Co. would have no incentive to reduce losses
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter applicable on Distribution Co. but Supplier responsible		
Capital investment	Could be difficult to invest capital		
Ease of billing	Meter reading and billing with separate entities		
Number of visits to consumer	Single visit for meter reading and meter operations		
Ease of consumer switching	No change required in metering		

Back to stage wise table

Metering services ***Approach IV***

New Scenario: Losses allocated to 3rd party company assuming metering is a licensed activity

- Meter reading – 3rd Party Company
- Other activities – 3rd Party Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)	Approach 4
Technical Loss	Distribution	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply	3rd party company
Inaccurate Metering	Distribution	Retail Supply	Retail Supply	3rd party company
Meter tampering	Distribution	Retail Supply	Retail Supply	3rd party company
Collection Loss	Retail Supply	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	No incentive to fudge losses	No incentive to fudge losses	No incentive to fudge losses	3rd party company could inflate billing to shift losses
Hooking losses	3rd party would have no incentive to report or reduce loss	3rd party would have no incentive to report or reduce loss	3rd party would have no incentive to report or reduce loss	3rd party would have incentive to report or reduce loss
Meter tampering / bypassing losses	3rd party would have no incentive to report or reduce loss	3rd party would have no incentive to report or reduce loss	3rd party would have no incentive to report or reduce loss	3rd party would have incentive to report or reduce loss
Conflict of Interest	Duty to install meter applicable on 3rd Party Co. but Supplier responsible (as per Section 55 of EA2003)			
Capital investment	Can do focused investments			
Ease of billing	Meter reading and billing with separate entities			
Number of visits to consumer	Single visit for meter reading and meter operations			
Ease of consumer switching	No change required in metering			

Metering services ***Approach V***

- Meter reading – Retail Supply Company
- Other activities – Distribution Company

Loss allocation	Approach 1 (D2A)	Approach 2 (D2B)	Approach 3 (D2C)
Technical Loss	Distribution	Distribution	Distribution
Hooking Loss	Distribution	Distribution	Retail Supply
Inaccurate Metering	Distribution	Retail Supply	Retail Supply
Meter tampering	Distribution	Retail Supply	Retail Supply
Collection Loss	Retail Supply	Retail Supply	Retail Supply
Possibility to fudge Losses	Unlikely as the supplier would have to generate lesser billing	Both meter tampering and collection loss with supplier, thus no incentive to fudge losses	Since all commercial losses are allocated to Supplier, it would make efforts to reduce them
Hooking losses	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit
Meter tampering / bypassing losses	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit	Appropriate entity will take care on consumer visit
Conflict of Interest (as per Section 55 of EA2003)	Duty to install meter applicable on Distribution Co. but Supplier responsible		
Capital investment	Could be difficult to invest capital		
Ease of billing	Meter reading and billing with supplier		
Number of visits to consumer	Separate visit for meter reading and meter operations		
Ease of consumer switching	No change required in metering		

Appendix 3
Other stage wise tasks

Stage 1 / Task 2

Defining roles and responsibilities of new entities

	Distribution	Retail Supply	Intermediary	Metering	Network Ops
Clear Roles & Reponsib-ilities	• Neutral access • Expansion and strengthening • Network O&M • 24x7 network availability • Co-ordination with transco • Co-ordination with Supply companies for new connection release, change in consumer load, disconnection • Fault restoration • Regulatory obligations	• Demand Forecasting • Efficient power procurement • Power trading • Bill generation and distribution • Revenue collection • Customer Care • Credit contracts • Regulatory obligations	• Procurement of power as per existing PPAs • Allocation of existing PPAs • Managing cross subsidies • Handling regulatory assets	• Installation and maintenance of meters • Testing of meters • Replacement of meters	• Network Supervision • Scheduling • Open Access • Balancing and Settlement
Discussion Point	• Consumer Interface • Loss reduction	• Consumer Interface • To ensure contractual availability of power to its consumers • Loss reduction	• Demand aggregation of Supply companies • Handling of unrecognized financial losses	• Meter reading	

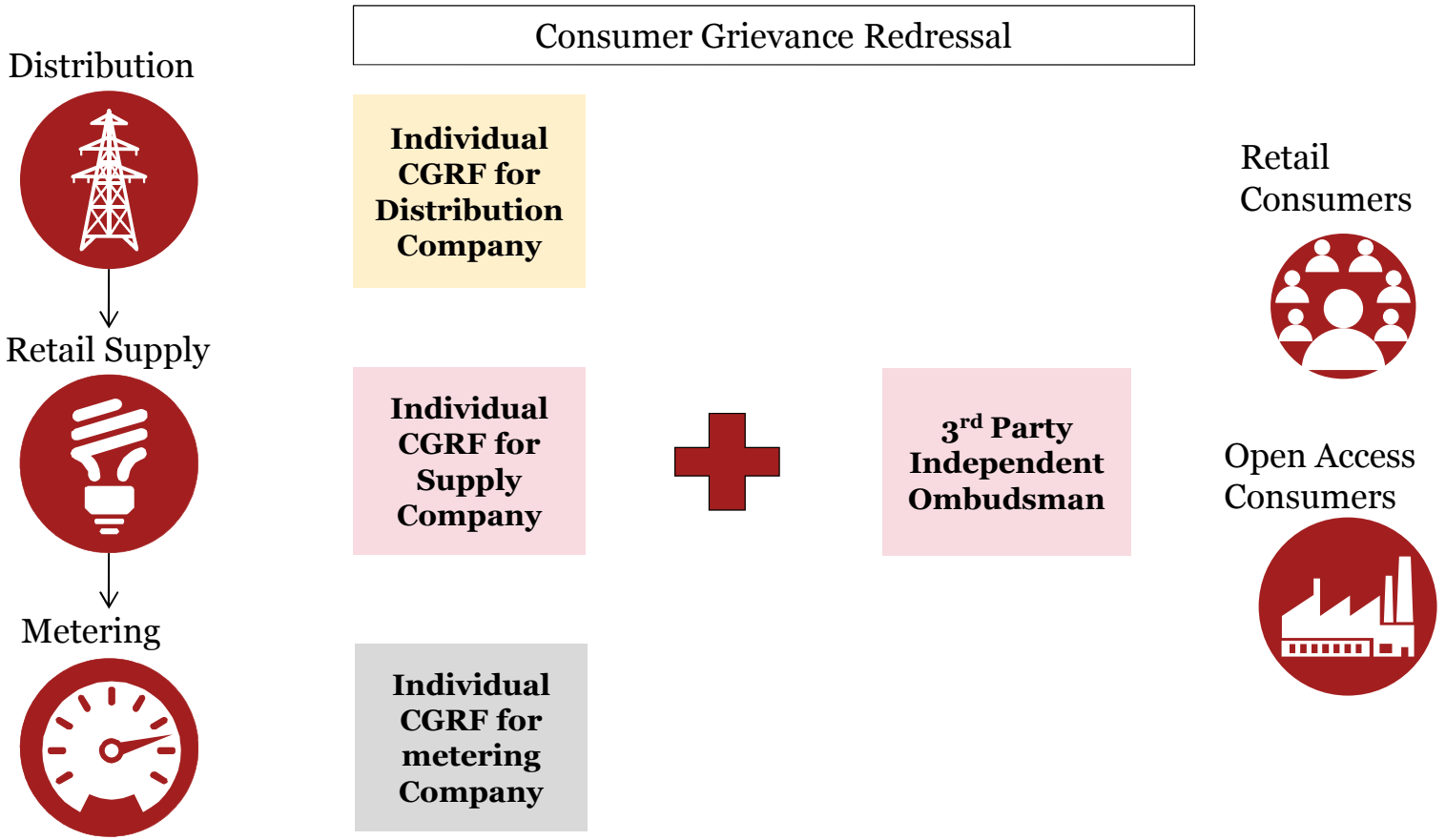
Stage 1 / Task 4
Transfer of existing PPAs

There are three approaches of transferring PPAs to the Intermediary Company, as follows –

- ***Transfer all PPAs*** of current Discom to Intermediary Company
- ***Transfer select PPAs*** of current Discoms to Intermediary Company (for instance certain expensive PPAs can be dissolved i.e. their power is to be sold through wholesale market while the remaining PPAs to be transferred to Intermediary Company)
- ***Transfer partial PPAs*** of current Discoms to Intermediary Company (for instance 60% of power from all PPAs could be transferred to Intermediary Company while the rest of the power to be sold in wholesale market)

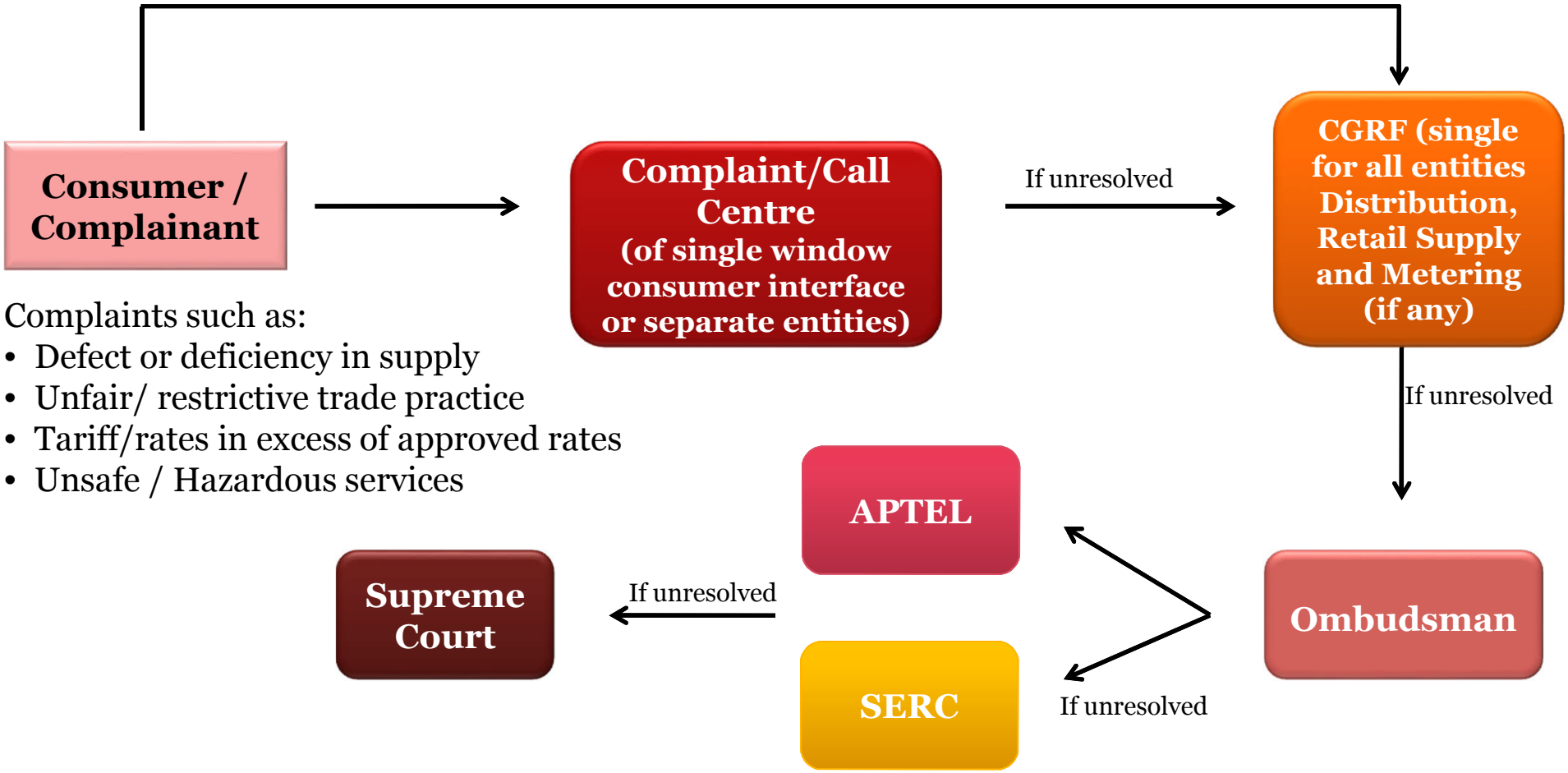
Stage 1 / Task 6

CGRF - Defining framework for Consumer Grievance Redressal Mechanism (1/2)



Stage 1 / Task 6

CGRF - Defining framework for Consumer Grievance Redressal Mechanism (2/2)



Complaints such as:

- Defect or deficiency in supply
- Unfair/ restrictive trade practice
- Tariff/rates in excess of approved rates
- Unsafe / Hazardous services

Back to stage wise table

Stage 1 / Task 10

Balance sheet segregation of current Distribution business among new entities

Liabilities

Long Term Liabilities –
Based on the fixed assets allocation between individual businesses

Short Term Liabilities –

- **Related to Power Purchase** – these will be transferred to Intermediary Company. The intermediary company would then further allocate them between Retail Supply Companies based on the allocation of PPAs
- **Related to contractor payments** - these will be allocated between the Distribution and Retail Supply companies based on the activities and asset allocation

Assets

Fixed Assets –

- **Fixed assets upto consumer meter –**would be allocated to Distribution Company
- **Other Fixed Assets** –like customer care centres will go to Supply Company. The metering assets will either go to Supply Company or 3rd Party metering service

Current Assets –

- **Receivables** –will be allocated to the Intermediary Company, which can then make settlements between Supply and Distribution Company. The Supply Company would act as a collection agency for these.
- **Consumer Security Deposits** –would be given to the Supply Company based on the number and type of consumer under each of the companies.
- Going forward in case the Distribution Company and Retail Supply Company require different security deposits form the consumers
- **Contractor's guarantees** –allocated between Distribution and Supply businesses based on the Fixed Assets allocation

Discussion Point

Valuation based on historical book value of assets or market value of assets

Back to balance sheet segregation

Consumer Deposits

- Section 47 and Section 51E of the Electricity (Amendment) Bill 2014 require a separate security deposit from consumers for Distribution and the Retail Supply Company
- After the introduction of retail supply competition the retail supply company may be held responsible for payments to be made to distribution business i.e. the Distribution Company does not collect revenue directly from the consumer
- In case a consumer defaults, the responsibility to pay the distribution company would still lie on the retail supply company.
- Therefore the security deposit should also be with the Retail Supply Company only.

Section 47 – Power to require security
Subject to the provisions of this section, a distribution licensee in the area of distribution may require any person, who requires connectivity to the distribution system in pursuance of section 43, to give him reasonable security, as may be determined by regulations….

Section 51E – Power to require security
Subject to the provisions of this section, a supply licensee may require any person, who requires a supply of electricity in pursuance of section 51 B, to give him reasonable security, as may be determined by regulations….

Stage 1 / Task 11
Human Resource Planning

1. **Transfer Scheme** - the employees of incumbent distribution company will need to be allocated between the two businesses. This would require –
    - transferring staff with adequate skill sets to the successor entities for carrying out critical activities independently.
    - Understanding the key staff requirements in restructured entities and identifying the services to be split between the entities.
    - If any particular service cannot be split among the entities, then the strategy to retain employees in one unit and providing services to other will have to be formed.
2. **Finalization of organizational & human resource policies of the separate companies** – defining the Human Resource policies, post the implementation of transfer scheme. This may include:
    - Assessment of actual requirement of human resources for various successor companies
    - Suggesting ways for upgrading staff competencies
    - Implementing an appropriate communications strategy
    - Compliance with legal requirements and reduce disputes/litigations and addressing stakeholder concerns

Stage 1 / Task 12

Technical studies of as-is condition

In order to prepare the groundwork for next stage, the following studies will need to be carried out in this stage:

1. **Study of Technical and Commercial losses –** current distribution companies will have to carry out technical studies to accurately measure voltage wise and area wise technical and commercial losses.

2. **Cost of Supply and cross subsidy study –** most of the State Commissions continue to use average cost of supply for the entire Discom to determine the tariffs. In order to make tariffs cost reflective, technical studies will have to be done by Discoms and SERCs to accurately calculate consumer category wise and area wise cost of supply. This would also help in measuring the existing level of cross subsidies. The discoms and SERCs would then have to chalk out a trajectory to reduce these cross subsidies in order to create a level playing field for all retail supply companies and remove entry barriers for new players.

Stage 2 / Task 1

Ownership of Retail Supply Company

In the beginning of Stage 2, due to the tasks performed in Stage 1, the Distribution and Retail Supply Company would have been segregated, but with same ownership of State Government.

Therefore in order to prevent any conflict of interest and to promote competition in the sector, the issue arises ***whether the Retail Supply Company would be divested so as to have separate ownership or will it continue to be a Stage Owned entity***.

Discussion Point

the Retail Supply Company can be –

- Divested to have separate ownership from Distribution Company
- Continued as a State entity

Section 14 of the Electricity (Amendment) Bill 2014, states that while multiple supply licensees could be allowed in a license area, at least one of them should be a government controlled.

'…Provided also that at least one of the supply licensee shall be a Government company or Government Controlled Company'

It needs to be ensured that while deciding on whether or not to divest the incumbent retail supply company, the provisions of Electricity Act (as and when passed by the parliament) are not violated.

Stage 2 / Task 4

Up gradation of existing metering

The existing meters would need to be replaced by Advanced Metering systems to allow for -

- Accurate measurement of loss levels in each area of supply and voltage levels. This data would be required to determine allowed level of losses for retail supply companies in a given area of supply.
- Calculation of actual power purchased and sold by each retail supply company.
- In case it is required to switch power on and off at consumer end, rather than at feeder level (Affecting all consumers), having Advanced Metering at consumer end would allow that.

The metering infrastructure till the distribution transformer will have to be upgraded by the distribution business.

On the other hand the entity which gets the responsibility of other meter related activities (Meter installation/replacement, ownership of metering assets, meter operations and testing) would have to convert un-metered consumers to metered consumers.

Stage 2 / Task 5
Creation of Consumer Database

Going forward, ***a central database would need to be created with information regarding the consumer***. An activity similar to ***Know Your Customer (KYC)*** can be carried out. The issues that will arise regarding such a database are -

- **What data fields will be collected in this database?** – data related to following categories can be collected
    - Data related to consumer – address, meter details, consumer category etc.
    - Entities serving consumer – appointed distribution company, metering company (if any), retail supplier
    - Data related to energy usage – consumption pattern, connected load, load profile
- **Who will own, collect and maintain the database?** – The data collection agency will collect data individually and then share this data with other entities. The data collection can be done through -
    - ☒ Retail Supply Company
    - ☑ Distribution Company
    - ☒ 3rd party metering company (if any)
- **Data privacy issues/who can access the data?** – it needs to be deliberated whether database of consumers of specific supply area be accessible to only retail supply companies and distribution companies of that area or anyone who wants to access it.

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Stage 3 / Task 1

Entry of second Retail Supply Company and defining area of supply

In this stage after the entry barriers are removed for new retail supply companies due to tasks performed in Stage 1 and Stage 2, second (and further on) retail supply company would be allowed to enter market in order to compete with incumbent retail supply company.

Discussion Point

Area of Supply of new Retail Supply Companies: It needs to be decided whether the area of supply offered to the new retail supply company would be -

- Same as the area of supply of incumbent retail supply company, or
- The current area of supply would be broken down into smaller regions

Stage 3 / Task 4
Consumer switching mechanism

Shifting of consumers from one retail supplier to another would need liberation on following changeover activities –

- **Recovery of stranded costs like past revenue gaps or regulatory assets from consumers -** the Intermediary Company may have to create a mechanism to ensure collection of these costs from concerned consumers irrespective of the retail supplier they are taking electricity from.
- **Recovery of dues from consumer -** a robust communication mechanism will have to be developed by the retail supply companies among themselves to ensure such consumers are not allowed to switch retail suppliers without clearing there past dues.
- **Defining consumer category at the time of switching -** needs to be deliberated whether a consumer would be allowed to change consumer category while switching its retail supplier or will the consumer be allowed to switch in the same consumer category only.
- **Security Deposits -** needs to be deliberated whether the existing security deposit of consumer with the current retail supply company would be refunded to the consumer or settled with the new retail supply company.
- **Frequency of consumer switching -** needs to be deliberated that when will the consumers be allowed to switch from one retail supplier to another. High switching rates of consumers could create difficulties for retail supply companies in managing their power procurement and demand forecasting.

Stage 3 / Task 5

Process for procurement of new PPAs

One of the ***pre-requisites of introduction of Retail Supply Competition is setting up of an efficient Wholesale Electricity market***. However considering the nascent stages of development of such a market, the Retail Supply companies will have to rely on PPA route in the future to procure power for long term.

Discussion Point

The Retail Supply Companies can enter into new PPA through following approaches –

- **Individual Contracts with generators**
- **Demand Aggregation:** The Intermediary Company can act as a demand aggregator for smaller Retail Supply Companies

Stage 3 / Task 8

Defining framework for Provider of Last Resort

A retail consumer may not get electricity in following scenarios –

- Supply Company is unable to supply electricity
- Supply Company is unable to continue its business and therefore its service obligations towards consumers

In such cases a designated 'Provider of Last Resort' would have to supply electricity to such consumers. The following issues will need deliberation –

1. **Tariff Determination:** The following approaches may be adopted for compensating the POLR -

Discussion Point

   1. Tariff of failed retail supply company
   2. Regulated tariff
   3. Competitive tariff
   4. Celling tariff
   5. Actual cost pass through

2. **Penalty**
3. **Implementation and Monitoring**

Stage 3 / Task 8

Defining framework for Provider of Last Resort

Pros and Cons

Approach	Pros	Cons
Regarding tariff determination for POLR		
Tariff of failed retail supply company	• The consumers would be at benefit here as they might get to continue enjoying same tariffs as before	• The State Government or Intermediary Company might have to fund the difference between actual cost of supply
Regulated tariff	• Prevention of consumer exploitation on account of higher tariffs	• The State Government or Intermediary Company might have to fund the difference between actual cost of supply
Competitive tariff	• POLR would not differentiate between regular consumers and consumers who came through POLR route	• Consumers could be exploited with higher tariffs
Ceiling tariff	• Consumers would be protected against high tariffs from POLR	• The State Government or Intermediary Company might have to fund the difference between actual cost of supply
Actual cost pass through	• No financial burden on POLR	• The POLR might load more than fair share of losses on such consumers

Stage 3 / Task 9

USO extends to new retail supply companies

Universal Service Obligation, after the introduction of second retail supply companies, would be

- applicable on all Retail Supply Companies
- for consumer segments open to competition.

Appendix 4
UC Charge model

Universal Charge (UC) Model

A Universal Charge (UC) may be imposed on all consumers. This UC would be an identical charge imposed on per-unit basis on sales to all consumers of incumbent distribution companies and collection of UC would go towards a state-wide/national fund to reduce the extent of cross subsidy in retail supply

Illustration:

- The illustration shows a simplified working model showing the proposed mode of levying Universal Charge (UC) and its subsequent utilization towards reducing cross-subsidies.
- The illustration uses cost of supply data from Punjab to estimate working of UC
- The illustration looks at a five-year time period. Cross subsidies (in this illustration) are entirely removed within this time period.
- In other states model may be extended to further years and/or modified accordingly once a timeframe is decided for elimination of cross-subsidies

	BASE YEAR			YEAR 1		STAGE 1		STAGE 2		STAGE 3					
						Tariff after CS Neutral Hike		Increase due to targeted CoS coverage		Increase due to cost/revenue mismatch					
Consumer Categories	CoS	Tariff	CoS coverage	Sales	CoS	Tariff	CoS coverage	Tariff	CoS coverage	Revenue from step 2 tariff (A)	ARR (B)	Gap to be filled by UC (A - B)	Tariff + UC	Revenue generated from UC	Additional fund required from govt.
Industrial - 66 kV	4.82	5.61	116%	2,426	5.06	5.89	116%	5.72	113%	1,389	1,228	(161)	6.22	121	-
Industry LS	5.13	5.61	109%	5,100	5.39	5.89	109%	5.79	107%	2,953	2,747	(206)	6.29	255	-
Domestic – 11 kV	4.90	5.81	119%	80	5.15	6.10	119%	5.91	115%	47	41	(6)	6.41	4	-
Commercial - 11 kV	5.09	6.03	118%	622	5.34	6.33	118%	6.13	115%	381	332	(49)	6.63	31	-
Bulk	4.94	5.59	113%	293	5.19	5.87	113%	5.73	111%	168	152	(16)	6.23	15	-
Industry MS	6.17	5.61	91%	1,861	6.48	5.89	91%	6.01	93%	1,118	1,206	88	6.51	93	93
Industry SP	6.57	5.10	78%	904	6.90	5.36	78%	5.66	82%	512	623	112	6.16	45	45
Domestic (0-100)	5.52	4.09	74%	5,440	5.80	4.29	74%	4.59	79%	2,499	3,153	653	5.09	272	272
Domestic (101-300)	5.52	5.49	99%	3,193	5.80	5.76	99%	5.77	100%	1,843	1,851	8	6.27	160	160
Domestic (above 300)	5.52	5.81	105%	1,550	5.80	6.10	105%	6.04	104%	936	898	(38)	6.54	77	-
Agriculture	5.33	4.18	78%	11,772	5.60	4.39	78%	4.63	83%	5,451	6,588	1,137	5.13	589	589
Commercial	5.92	6.03	102%	2,469	6.22	6.33	102%	6.31	101%	1,557	1,535	(23)	6.81	123	-
Public Lighting	5.62	6.03	107%	140	5.90	6.33	107%	6.25	106%	88	83	(5)	6.75	7	-
Total				37,035						19,554	20,957	1,404		1,852	1,174

UC Charge	0.50
UC Fund at start	0.00
UC Fund at end	448

	YEAR 2		STAGE 1		STAGE 2		STAGE 3					
			Tariff after CS Neutral Hike		Increase due to targeted CoS coverage		Increase due to cost/revenue mismatch					
Consumer Categories	Sales	CoS	Tariff	CoS coverage	Tariff	CoS coverage	Revenue from step 2 tariff (A)	ARR (B)	Gap to be filled by UC (A - B)	Tariff + UC	Revenue generated from UC	Additional fund required from govt.
Industrial - 66 kV	2,453	5.31	6.19	116%	5.84	110%	1,431	1,303	(128)	6.14	74	-
Industry LS	5,139	5.66	6.19	109%	5.97	106%	3,070	2,906	(163)	6.27	154	-
Domestic - 11 kV	85	5.40	6.41	119%	6.00	111%	51	46	(5)	6.30	3	-
Commercial - 11 kV	677	5.61	6.65	118%	6.23	111%	422	380	(42)	6.53	20	-
Bulk	301	5.45	6.16	113%	5.88	108%	177	164	(13)	6.18	9	-
Industry MS	1,908	6.80	6.19	91%	6.43	95%	1,227	1,298	71	6.73	57	57
Industry SP	916	7.24	5.62	78%	6.27	87%	575	664	89	6.57	27	27
Domestic (0-100)	5,766	6.09	4.51	74%	5.14	84%	2,964	3,509	545	5.44	173	173
Domestic (101-300)	3,458	6.09	6.05	99%	6.07	100%	2,097	2,104	7	6.37	104	104
Domestic (above 300)	1,616	6.09	6.41	105%	6.28	103%	1,015	983	(31)	6.58	48	-
Agriculture	12,594	5.88	4.61	78%	5.12	87%	6,443	7,401	958	5.42	378	378
Commercial	2,688	6.53	6.65	102%	6.60	101%	1,774	1,755	(20)	6.90	81	-
Public Lighting	146	6.20	6.65	107%	6.47	104%	94	90	(4)	6.77	4	-
Total	38,974						21,982	23,169	1,187		1,169	748

UC Charge	0.30
UC Fund at start	448
UC Fund at end	430

	YEAR 3		STAGE 1		STAGE 2		STAGE 3					
			Tariff after CS Neutral Hike		Increase due to targeted CoS coverage		Increase due to cost/revenue mismatch					
Consumer Categories	Sales	CoS	Tariff	CoS coverage	Tariff	CoS coverage	Revenue from step 2 tariff (A)	ARR (B)	Gap to be filled by UC (A - B)	Tariff + UC	Revenue generated from UC	Additional fund required from govt.
Industrial - 66 kV	2,479	5.58	6.49	116%	5.95	107%	1,474	1,383	(91)	6.20	62	-
Industry LS	5,178	5.94	6.49	109%	6.16	104%	3,190	3,075	(115)	6.41	129	-
Domestic - 11 kV	90	5.67	6.73	119%	6.09	107%	55	51	(4)	6.34	2	-
Commercial - 11 kV	737	5.89	6.98	118%	6.33	107%	467	435	(32)	6.58	18	-
Bulk	309	5.72	6.47	113%	6.02	105%	186	177	(9)	6.27	8	-
Industry MS	1,956	7.14	6.49	91%	6.88	96%	1,347	1,397	51	7.13	49	49
Industry SP	929	7.61	5.90	78%	6.92	91%	643	707	63	7.17	23	23
Domestic (0-100)	6,112	6.39	4.73	74%	5.73	90%	3,501	3,906	405	5.98	153	153
Domestic (101-300)	3,744	6.39	6.36	99%	6.38	100%	2,387	2,392	5	6.63	94	94
Domestic (above 300)	1,685	6.39	6.73	105%	6.52	102%	1,100	1,077	(23)	6.77	42	-
Agriculture	13,474	6.17	4.84	78%	5.64	91%	7,596	8,314	717	5.89	337	337
Commercial	2,928	6.85	6.98	102%	6.90	101%	2,021	2,006	(15)	7.15	73	-
Public Lighting	152	6.51	6.98	107%	6.70	103%	102	99	(3)	6.95	4	-
Total	41,047						24,741	25,633	892		1,026	663

UC Charge	0.25
UC Fund at start	430
UC Fund at end	565

	YEAR 4		STAGE 1		STAGE 2		STAGE 3					
			Tariff after CS Neutral Hike		Increase due to targeted CoS coverage		Increase due to cost/revenue mismatch					
Consumer Categories	Sales	CoS	Tariff	CoS coverage	Tariff	CoS coverage	Revenue from step 2 tariff (A)	ARR (B)	Gap to be filled by UC (A - B)	Tariff + UC	Revenue generated from UC	Additional fund required from govt.
Industrial - 66 kV	2,506	5.86	6.82	116%	6.05	103%	1,517	1,468	(48)	6.15	25	-
Industry LS	5,217	6.24	6.82	109%	6.35	102%	3,314	3,253	(61)	6.45	52	-
Domestic - 11 kV	96	5.96	7.06	119%	6.18	104%	59	57	(2)	6.28	1	-
Commercial - 11 kV	803	6.19	7.33	118%	6.42	104%	515	497	(18)	6.52	8	-
Bulk	317	6.00	6.79	113%	6.16	103%	196	191	(5)	6.26	3	-
Industry MS	2,006	7.50	6.82	91%	7.36	98%	1,477	1,504	27	7.46	20	20
Industry SP	942	7.99	6.20	78%	7.63	96%	719	752	34	7.73	9	9
Domestic (0-100)	6,479	6.71	4.97	74%	6.36	95%	4,122	4,347	225	6.46	65	65
Domestic (101-300)	4,054	6.71	6.67	99%	6.70	100%	2,717	2,720	3	6.80	41	41
Domestic (above 300)	1,757	6.71	7.06	105%	6.78	101%	1,192	1,179	(12)	6.88	18	-
Agriculture	14,415	6.48	5.08	78%	6.20	96%	8,936	9,339	403	6.30	144	144
Commercial	3,188	7.20	7.33	102%	7.22	100%	2,303	2,294	(9)	7.32	32	-
Public Lighting	158	6.83	7.33	107%	6.93	101%	109	108	(2)	7.03	2	-
Total	43,264						27,879	28,381	502		433	282

UC Charge	0.10
UC Fund at start	565
UC Fund at end	496

	YEAR 5		STAGE 1		STAGE 2		STAGE 3					
			Increase due to rise in CoS		Increase due to targeted CoS coverage		Increase due to cost/revenue mismatch					
Consumer Categories	Sales	CoS	Tariff	CoS coverage	Tariff	CoS coverage	Revenue from step 2 tariff (A)	ARR (B)	Gap to be filled by UC (A - B)	Tariff + UC	Revenue generated from UC	Additional fund required from govt.
Industrial - 66 kV	2,534	6.15	7.16	116%	6.15	100%	1,559	1,559	-	6.15	-	-
Industry LS	5,256	6.55	7.16	109%	6.55	100%	3,441	3,441	-	6.55	-	-
Domestic - 11 kV	102	6.25	7.42	119%	6.25	100%	64	64	-	6.25	-	-
Commercial - 11 kV	875	6.50	7.70	118%	6.50	100%	568	568	-	6.50	-	-
Bulk	326	6.30	7.13	113%	6.30	100%	205	205	-	6.30	-	-
Industry MS	2,056	7.87	7.16	91%	7.87	100%	1,619	1,619	-	7.87	-	-
Industry SP	956	8.39	6.51	78%	8.39	100%	801	801	-	8.39	-	-
Domestic (0-100)	6,867	7.05	5.22	74%	7.05	100%	4,838	4,838	-	7.05	-	-
Domestic (101-300)	4,390	7.05	7.01	99%	7.05	100%	3,093	3,093	-	7.05	-	-
Domestic (above 300)	1,833	7.05	7.42	105%	7.05	100%	1,291	1,291	-	7.05	-	-
Agriculture	15,422	6.80	5.33	78%	6.80	100%	10,491	10,491	-	6.80	-	-
Commercial	3,472	7.56	7.70	102%	7.56	100%	2,623	2,623	-	7.56	-	-
Public Lighting	164	7.17	7.70	107%	7.17	100%	118	118	-	7.17	-	-
Total	45,636						31,446	31,446	-		-	-

UC Charge	0.00
UC Fund at start	496
UC Fund at end	496

Appendix 5
Limiting cross subsidies to wheeling charge

Limiting cross subsidies to wheeling charge

		Domestic	Agricultural	Industrial	Commercial
CoS	Cost of Supply	6	9	2	4
W	Wheeling	2	4	0.5	2
E	Energy	2	2	1	1
C	Customer	2	3	0.5	1
T	Tariff	4	5	5	7
E+C	Minimum Tariff payable	4	5	1.5	2
T-CoS	Subsidy Enjoyed (T-CoS)	(2)	(4)	3	3

All figures in Rs. per unit. For representation purpose only.

- The tariff of any category must cover the energy and customer related costs.
- Cross subsidy is passed on to Wheeling charges.
- Cost of supply studies and unbundling of costs into Demand, Energy and Customer related costs and estimation of wheeling cost is a necessary pre-requisite for rolling out such a scheme

Appendix 6
Illustrations for Allocation of PPAs

Allocation of PPAs – market scenarios

Each of the PPA allocation approach is evaluated against market scenarios as follows -

Market Scenarios		Availability of Energy	
		Energy Surplus	Energy Deficit
Cost of PPAs	PPAs expensive than market	I	III
	PPAs cheaper than market	II	IV

For each of these market scenario, an illustration is prepared to depict profit/loss that various suppliers would make under each of the PPA allocation approaches. Following assumptions are made for these illustrations -

- Total number of consumers – 10,00,000
- Current Power Requirement of Discom – 500 MW (or ~4.4 billion units)
- Number of Retail Supply Companies after introduction of competition – 2
- Number of consumers with Incumbent Supplier– 8,00,000
- Number of consumers with new Supply Company – 2,00,000
- Power requirement of Incumbent Supplier – 400 MW (or ~ 3.5 billion units)
- Power requirement of new Supply Company – 100 MW (or ~ 0.9 billion units)

Allocation of PPAs - illustrations (1/4)

Market Scenario I – Energy Surplus *scenario where* ***PPAs are expensive*** *than the power available in market*

- Current PPAs of Discom (transferred to Intermediary Company) – 450 MW (or ~4 billion units)
- United generation capacity - 100 MW (or ~800 million units)
- Rate of power allocated by IC – Rs. 1 per unit (same as cost of its PPAs)
- Rate of power purchased from market/generator – Rs. 0.5 per unit

Scenarios/Approach	Approach 1	Approach 2	Approach 3	Approach 4	Approach 5	Approach 6
Power allocated by IC to ISL	400 MW	400 MW	350 MW	350 MW	360 MW	360 MW
Power allocated by IC to RSL	50 MW	50 MW	100 MW	100 MW	90 MW	90 MW
Power accepted by RSL from IC	50 MW	-	100 MW	-	90 MW	-
Power purchased from market by ISL	-	-	50 MW	50 MW	40 MW	40 MW
Power purchased from market by RSL	50 MW	100 MW	-	100 MW	10 MW	100 MW
Gain/loss to IC	-	(Rs. 45 million)	-	(Rs. 90 million)	-	(Rs. 81 million)
Gain/loss to ISL	-	-	Rs. 45 million	Rs. 45 million	Rs. 36 million	Rs. 36 million
Gain/loss to RSL	Rs. 45 million	Rs. 90 million	-	Rs. 90 million	Rs. 9 million	Rs. 45 million

Allocation of PPAs - illustrations (2/4)

Market Scenario II– Energy Surplus *scenario where* ***PPAs are cheaper*** *than the power available in market*

- Current PPAs of Discom (transferred to Intermediary Company) – 450 MW (or ~4 billion units)
- United generation capacity - 100 MW (or ~800 million units)
- Rate of power allocated by IC – Rs. 1 per unit (same as cost of its PPAs)
- Rate of power purchased from market/generator – Rs. 1.5 per unit

Scenarios/Approach	Approach 1	Approach 2	Approach 3	Approach 4	Approach 5	Approach 6
Power allocated by IC to ISL	400 MW	400 MW	350 MW	350 MW	360 MW	360 MW
Power allocated by IC to RSL	50 MW	50 MW	100 MW	100 MW	90 MW	90 MW
Power accepted by RSL. from IC	50 MW	-	100 MW	-	90 MW	-
Power purchased from market by ISL	-	-	50 MW	50 MW	40 MW	40 MW
Power purchased from market by RSL	50 MW	100 MW	-	100 MW	10 MW	100 MW
Gain/loss to IC	-	Rs. 45 million	-	Rs. 90 million	-	Rs. 81 million
Gain/loss to ISL	-	-	(Rs. 45 million)	(Rs. 45 million)	(Rs. 36 million)	(Rs. 36 million)
Gain/loss to RSL	(Rs. 45 million)	(Rs. 90 million)	-	(Rs. 90 million)	(Rs. 9 million)	(Rs. 45 million)

Allocation of PPAs - illustrations (3/4)

Market Scenario III– Energy Deficit *scenario where* ***PPAs are expensive*** *than the power available in market*

- Current PPAs of Discom (transferred to Intermediary Company) – 400 MW (or ~3.5 billion units)
- United generation capacity - 50 MW (or ~400 million units)
- Rate of power allocated by IC – Rs. 1 per unit (same as cost of its PPAs)
- Rate of power purchased from market/generator – Rs. 0.5 per unit

Scenarios/Approach	Approach 1 – D7A	Approach 2 – D7B	Approach 3 – D7C	Approach 4 – D7D	Approach 5 – D7E	Approach 6 – D7F
Power allocated by IC to ISL	400 MW	400 MW	300 MW	300 MW	320 MW	320 MW
Power allocated by IC to RSL	-	-	100 MW	100 MW	80 MW	80 MW
Power accepted by RSL from IC	-	-	100 MW	100 MW	80 MW	80 MW
Power purchased from market by ISL	-	-	50 MW	50 MW	40 MW	40 MW
Power purchased from market by RSL	50 MW	50 MW	-	-	10 MW	100 MW
Gain/loss to IC	-	-	-	-	-	-
Gain/loss to ISL on account of power purchase	-	-	Rs. 45 million	Rs. 45 million	Rs. 36 million	Rs. 36 million
Loss to ISL on account of un-availability of power	-	-	(Rs. 45 million)	(Rs. 45 million)	(Rs. 36 million)	(Rs. 36 million)
Gain/loss to RSL on account of power purchase	Rs. 45 million	Rs. 45 million	-	-	Rs. 9 million	Rs. 9 million
Loss to ISL on account of un-availability of power	(Rs. 45 million)	(Rs. 45 million)	-	-	(Rs. 9 million)	(Rs. 9 million)

Allocation of PPAs - illustrations (4/4)

***Market Scenario IV– Energy Deficit** scenario where **PPAs are cheaper** than the power available in market*

- Current PPAs of Discom (transferred to Intermediary Company) – 400 MW (or ~3.5 billion units)
- United generation capacity - 50 MW (or ~400 million units)
- Rate of power allocated by IC – Rs. 1 per unit (same as cost of its PPAs)
- Rate of power purchased from market/generator – Rs. 1.5 per unit

Scenarios/Approach	Approach 1 – D7A	Approach 2 – D7B	Approach 3 – D7C	Approach 4 – D7D	Approach 5 – D7E	Approach 6 – D7F
Power allocated by IC to ISL	400 MW	400 MW	300 MW	300 MW	320 MW	320 MW
Power allocated by IC to RSL	-	-	100 MW	100 MW	80 MW	80 MW
Power accepted by RSL from IC	-	-	100 MW	100 MW	80 MW	80 MW
Power purchased from market by ISL	-	-	50 MW	50 MW	40 MW	40 MW
Power purchased from market by RSL	50 MW	50 MW	-	-	10 MW	100 MW
Gain/loss to IC	-	-	-	-	-	-
Gain/loss to ISL on account of power purchase	-	-	(Rs. 45 million)	(Rs. 45 million)	(Rs. 36 million)	(Rs. 36 million)
Loss to ISL on account of un-availability of power	-	-	(Rs. 45 million)	(Rs. 45 million)	(Rs. 36 million)	(Rs. 36 million)
Gain/loss to RSL on account of power purchase	(Rs. 45 million)	(Rs. 45 million)	-	-	(Rs. 9 million)	(Rs. 9 million)
Loss to ISL on account of un-availability of power	(Rs. 45 million)	(Rs. 45 million)	-	-	(Rs. 9 million)	(Rs. 9 million)